CLAIMS

WHAT IS CLAIMED IS:

1. An adjustable orthopedic tool comprising:

a shaft portion having first and second ends and a longitudinal axis, an adjustment portion and a fastener receiving portion, the first end comprising a cutting portion configured to drill a hole in bone, and the second end configured to be coupled to a source of rotational motion;

a fastener engaging portion; and

an adjustment mechanism mounted on the shaft and configured to allow the user to vary a distance between the cutting portion and the fastener engaging portion;

wherein the fastener receiving portion is configured to receive at least a portion of a cannulated fastener thereon; the fastener engaging portion is configured to rotationally couple the tool to a driving portion of the cannulated fastener to transmit rotational motion thereto; and the adjustment mechanism is selectively movable along the longitudinal axis of the shaft to allow the tool to accept fasteners having different lengths.

2. The adjustable orthopedic tool of claim 1, wherein the cutting portion and the fastener engaging portion can be rotated at different speeds with respect to one another.

3. The adjustable orthopedic tool of claim 1, the adjustment portion of the shaft further comprising external threads and the adjustment mechanism further comprising internal threads, wherein the threads are engageable to allow the shaft and mechanism to be moved axially along a longitudinal axis of the shaft by rotating the pieces with respect to each other.

4. The adjustable orthopedic tool of claim 1, wherein movement of the adjustment mechanism adjusts the distance between the fastener engaging portion of the adjustment mechanism and the cutting portion of the shaft.

5. The adjustable orthopedic tool of claim 4, wherein the adjustment mechanism comprises at least first and second sleeves, the first sleeve comprising inner threads configured to engage the external threads of the shaft and the fastener engaging portion disposed on the second sleeve.

6. The adjustable orthopedic tool of claim 5, the shaft further comprising a plurality of calibration marks disposed between the adjustment portion and the second end, each calibration mark corresponding to a predetermined distance between the fastener engaging portion of the adjustment mechanism and the first end of the shaft.

7. The adjustable orthopedic tool of claim 6, the first sleeve further having a proximal end, wherein adjusting the adjustment mechanism so that the proximal end of the first sleeve lies adjacent to one of the calibration marks results in the fastener engaging portion of the adjustment mechanism being located a predetermined distance from the first end of the shaft corresponding to the mark.

8. The adjustable orthopedic tool of claim 4, wherein when a cannulated fastener having a head portion and a tip portion is received on the shaft, the distance is adjustable to allow the fastener engaging portion of the adjustment assembly to rotationally engage the fastener head while allowing at least a first length of the shaft cutting portion to extend distally beyond the fastener tip.

9. The adjustable orthopedic tool of claim 5, wherein the first length is selected in the range of from about 0 millimeters (mm) to about 10 mm.

10. The adjustable orthopedic tool of claim 9, wherein the first length is about 1mm.

11. The adjustable orthopedic tool of claim 9, wherein the first length is about 4.5 mm.

12. A bone fastener system comprising:
at least first and second cannulated fasteners;

at least one adjustable tool having first and second ends and an adjustment portion, the first end comprising a cutting blade configured to drill a hole in bone and a shaft portion configured to be received within the cannulation of the at least one cannulated screw; and

at least one bone plate having at least one hole configured to receive the fastener to fix the plate the bone.

13. The bone fastener system of claim 12, the second end of the adjustable tool configured to be coupled to a source of rotational motion, the tool further having an intermediate shaft portion disposed between the first and second ends, the adjustment portion further configured to be axially movable along the intermediate portion.

14. The bone fastener system of claim 13, the adjustment portion further comprising a distal end configured to rotationally engage a head portion of at least one of the first and second fasteners, the adjustment portion further configured to allow a user to vary a distance between the cutting blade and the distal end of the adjustment mechanism.

15. The bone fastener system of claim 14, wherein the cutting blade and the adjustment portion distal end can be rotated at different speeds with respect to each other.

16. The bone fastener system of claim 15, the adjustment portion further configured to be selectively adjustable along the intermediate shaft portion to adjust an axial distance between the distal end of the adjustment portion and the tool first end.

17. The bone fastener system of claim 16, the intermediate shaft portion comprising a plurality of calibration markings and the adjustment portion having a proximal end, wherein when the adjustment portion is adjusted to align the proximal end adjacent to one of the plurality of markings results in the distal end of the adjustment portion being located a predetermined distance from the tool first end.

18. The bone fastener system of claim 17, the first fastener having a head portion, a first length and a distal tip, wherein when the tool adjustment portion is adjusted to align the proximal end adjacent to one of the plurality of markings, the first end of the tool is located a first predetermined distance distal to the first fastener distal tip.

19. The bone fastener system of claim 18, wherein the first predetermined distance is in the range of from about 0 mm to about 10 mm.

20. The bone fastener system of claim 18, wherein the first predetermined distance is about 1mm.

21. The bone fastener system of claim 18, wherein the first predetermined distance is about 4.5 mm.

22. The bone fastener system of claim 17, the second fastener having a head portion, a second length and a distal tip, wherein when the tool adjustment portion is adjusted to align the proximal end adjacent to one of the plurality of markings, the first end of the tool is located a second predetermined distance distal to the second fastener distal tip.

23. The bone fastener system of claim 22, wherein the first and second lengths are substantially unequal, and the first and second predetermined distances are substantially equal.

24. The bone fastener system of claim 12, wherein at least the first fastener has a cannulation comprising a length, the cannulation having a polygonal shape for at least a portion of its length.

25. The bone fastener system of claim 12, wherein at least the first fastener has a head portion, the head portion comprising a flange having an underside configured to engage a bone or bone plate surface.

26. The bone fastener system of claim 12, wherein the fastener member has at least one cutting flute for engaging and cutting bone.

27. The bone fastener system of claim 12, wherein the fastener member comprises self-tapping threads.

28. The bone fastener system of claim 12, the intermediate portion further comprising a first length, the first and second fasteners each comprising a second length, the first length being sufficient to allow at least the first and second fastener members to be simultaneously received on the intermediate portion.

29. The bone fastener system of claim 12, wherein the first end further comprises a raised portion for provisionally axially retaining at least one of the fastener members to the tool.

30. A method of installing at least a first bone fastener in bone, the fastener comprising a cannulated bone fastener having a head portion and a tip portion, where at least a portion of the cannulation formed in a polygonal shape; the method comprising:

(a) providing a tool with first and second ends, a shaft having a drilling tip and an outer surface configured to receive the cannulation of the fastener, a sleeve having a distal end shaped to engage the polygonal portion of the cannulation of the fastener, and an adjustment mechanism for adjusting the distance between the drilling tip and the distal end of the sleeve;

(b) inserting the first fastener onto the outer surface of the shaft;

(c) engaging the sleeve with the polygonal portion of the fastener cannulation;

(d) adjusting the distance between the drilling tip and the distal end of the sleeve to allow at least a portion of the cutting tip to extend distally beyond the fastener tip;

(e) rotating the drilling blade of the tool against the surface of a bone;

(f) continuing rotation of the drilling blade until the fastener is fully engaged in the bone; and

(g) removing the tool from the cannulation of the fastener.

31. The method of claim 30, wherein the fastener has a head portion, said head portion comprising a flange having an underside configured to engage a bone or bone plate surface.

32. The method of claim 30, wherein the fastener has at least one cutting flute for engaging and cutting bone.

33. The method of claim 30, the shaft further having a proximal portion opposite the drilling tip, the proximal portion comprising a plurality of calibrated markings, wherein step (d) further comprising aligning a proximal portion of the adjustment mechanism to align with at least one of the calibrated markings so that the cutting tip extends beyond the fastener distal tip by a corresponding pre-set amount.

34. The method of claim 33, wherein the pre-set amount is adjustable in the range of from about 0 mm to about 10 mm.

35. The method of claim 34, wherein the tool has a retention feature to provisionally axially retain the fastener on the tool.

36. The method of claim 35, wherein the retention feature comprises a flared portion adjacent the distal end of the tool sleeve, the flared portion configured to interfere with the polygonal portion of the fastener cannulation.

37. The method of claim 30, further comprising a second cannulated fastener, wherein the outer surface is configured to receive the first and second cannulated fasteners at the same time.